

ENVIRONMENT, HEALTH & SAFETY DIVISION
Safety Engineering Group
Mail Stop 90K

Integrated Functional Appraisal (IFA)

Advanced Fusion and Accelerator Division (AFRD)

September 17, 2005



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Executive Summary

The Environmental Health and Safety (EH&S) Division of the Lawrence Berkeley National Laboratory (LBNL) conducted an Integrated Functional Appraisal (IFA) of the Advanced Fusion and Accelerator Division (AFRD). This is a triennial review of how well AFRD line management is implementing the Lawrence Berkeley Laboratory policies, approvals, and controls as defined by the Work Smart Standards (WSS). The scope of this IFA is:

- 1) Comprehensive review of formal work authorizations.
 - Activity Hazard Documents (AHD).
 - Radiological Work Authorizations (RWA).
 - Facility Safety Analysis Documents (FSAD).
- 2) Sample review of facility-based authorizations.
 - Facility Safety Analysis Documents (FSAD).
- 3) A representational sampling of technical work conducted under line management authorization (fabrication, assembly, and other experimental fabrication and assembly).
- 4) Office and other non-technical support areas.

The IFA team was chosen based on subject matter expertise, consisting of:

- 1) Occupational Safety with special attention to Electrical Safety.
- 2) Industrial Hygiene.
- 3) Waste Management.
- 4) Radiation Protection.
- 5) Ergonomics.

The team held a series of AFRD space inspections covering all AFRD spaces including laboratories, offices, shops, and peripheral storage areas.

The results of the IFA indicate that AFRD has, with few exceptions, a very strong environmental safety and health (ES&H) program. The division uses a network of researchers tasked with various levels of ESH oversight. Each program (AFRD is composed of 6 distinct experimental programs) has an employee assigned ESH responsibility as part of the divisional oversight. The divisional program is generally

effective in identifying and controlling the hazards associated with high-energy physics and the peripheral issues of updating old experimental apparatus in old facilities in order to do safe cutting edge science. There were some issues identified in the division that needed increased vigilance, specifically building 58, and the division did address these in an appropriate and effective manner. There were also a number of noteworthy practices as well as some areas where the division leads the lab into compliance (these will be discussed later). The division is very committed to identify and correct issues such as LCATs, ergonomics, and OSHA compliance. While challenged by outdated space, seismic issues, and budgetary constraints the division continues to inspect all spaces 2-4 times each year and enter into LCATs all findings. The IFA team concludes that the division is operating safely and within authorized limits.

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Introduction

The EH&S division conducted an Integrated Safety Appraisal during a period from June to September 2005. This triennial review, along with the divisional self-assessment and the MESH review are important components of the three-part validation and assessment process used by the Berkeley lab in its Integrated Safety Management (ISM) system. The last IFA in AFRD was conducted in 2002.

IFA Purpose

The purpose of this IFA is to conduct a technical review of the AFRD formal work authorizations, Line Management authorizations, and general experiment and facility compliance issues (OSHA for example). Special attention is given to line management controls and participation.

1.1 Scope

The scope of the IFA is to review:

All work activities and operations of the division.

- Technical work conducted under formal authorizations.
 - High hazard requiring AHDs
 - Radiological hazards requiring RWAs or RWPs.
 - Line management authorizations some requiring FSADs
- Technical work under line management authorizations such as mechanical and electrical shops.
- Office space.

1.2 Compliance Emphasis

AFRD had a large number of OSHA findings in the 2004 OSHA audit. The division is working diligently to correct these non-compliances and is committed to avoiding future issues by including compliance in its new designs and upgrades. The L'Oasis and Supercon experiments are very good examples of this commitment. In addition the division is committed to mitigating those findings previously identified and tracking all findings of AFRD spaces to completion (including those that are intuitional).

2 Appraisal Process

2.1 Team

2.1.1 *Selection*

Team participants were selected for subject matter expertise and AFRD division appropriateness. The important subject needs for the AFRD divisions are:

- Line Management Issues - Pat Thomas.

- Experimental Evaluations and Controls -Christine Celata.

- Occupational Safety -Tom Caronna.

 - Electrical Safety.

 - Shop Safety.

 - Cranes and Hoists

- Industrial Hygiene -Betsy MacGowan.

- Radiation Safety -Ted Decastro.

 - Ionizing (X-Ray/Gamma).

 - Non-ionizing (Radio Frequency/Microwave).

- Waste Management -Martha White.

 - Oil such as machine oil and electrical oil (non PCB).

 - Shop Waste.

 - Electronic Waste.

2.1.2 Member Roles and Responsibilities

All team members were given the responsibility to report all and any EH&S concerns they identified to the team lead, regardless of subject matter. The appropriate subject matter expert then reviewed these findings.

Additionally, the recognized subject matter experts were tasked with evaluating all the formal authorizations for accuracy and appropriateness.

2.2 Defining Appraisal Areas

2.2.1 Document and database reviews

The IFA included a complete review of all Lab Databases. At the time of the inspection, each space was evaluated for participation and compliance for the HEAR, CMS, and RADAR databases. All hazards were noted and a cross check with the appropriate existing database information was done. Any new information or discrepancies were corrected and entered into the appropriate database at this time.

A review of the OSHA inspection issues clearly demonstrated that AFRD is very committed to eliminating non-compliance. All new experiments and upgrades for existing experiments are now getting an OSHA criteria review. Identification of Facility-level operations

The Division consists of five programs: Advanced Light Source (ALS) Accelerator Physics, Center for Beam Physics, Fusion Energy Research, Ion Beam Technology, and Superconducting Magnets.

The Accelerator Physics Group provides accelerator physics support both for day-to-day running and for enhancements of the ALS. The group is engaged in four main activities: establishing the storage-ring parameters to satisfy the production beam specifications, developing diagnostic tools and methods to ascertain machine characteristics, exploring new modes of storage-ring operation, and planning future upgrades of the existing accelerators or entirely new machines with advanced characteristics.

The Center for Beam Physics (CBP) performs research in accelerator theory, the application of high performance computing to accelerator modeling, beam electrodynamics, and laser-plasma acceleration. The Center's resources are applied to a broad range of activities: laser-driven research on advanced accelerator concepts and THz radiation sources, support for High Energy Physics facilities operations and upgrades as well as development of major accelerator-based initiatives, theoretical and computational modeling of existing and proposed accelerator facilities worldwide, and a new concept for a synchrotron light source intended to produce femtosecond pulses for ultra fast x-ray science.

The focus of the Fusion Energy Research Program is the generation of high-power, high-brightness beams of heavy ions; the physics of ion-beam propagation in the reaction chamber; and the validation of new, potentially more economical accelerator strategies.

The Ion Beam Technology program investigates plasma and ion-beam techniques for modifying and synthesizing materials in various fields and industry. Ion Beam Technology is divided into several groups, including: Plasma Applications, Plasma and Ion Source Technology, Medical Applications, Nuclear Physics, and Spallation Neutron Source Front-End Systems.

The Superconducting Magnet Program offers expertise from basic development of better superconducting materials to evaluation of finished magnets. The goal is to establish the technologies associated with very high field superconducting magnets in such a way that cost-effective ones will be

available for next-generation high-energy physics accelerators, such as the Very Large Hadron Collider or muon storage/collider rings.

The ESH oversight provided by the above, with each group and experiment assigning an employee (see AFRD ESH Organizational chart-Appendix B) to be responsible for compliance is one of the strong noteworthy practices.

AFRD has no true facility level operations. It does however have some experiments that are capable of other LBNL internal, and outside experimental use. It is hoped that this will become a reality in the future. There are some AFRD experiments at the Advanced Light Source under David Robin.

2.2.2 *Identification of Medium and High Hazard spaces and operations*

Line management authorizations are technically reviewed and monitored throughout the year. Examples of this include 1 test stand in the Iron Beam Two under Andre Enders in B53 Technologies group, an anti hydrogen trap under the Center for Beam Physics and a cleanup and disposal project in building 58. While some of these efforts are also covered under AHDs and other controls line management provides levels of participation not typical of stand alone experiments such as experienced mentors, cross experimental expertise, and written analysis of hazards and controls. (Appendix B)

2.2.3 *Identification of higher potential line management authorized work in technical work spaces*

All AFRD work efforts including experiments are evaluated for hazard levels using criteria from pub 3000 and other Work Smart Standards. These efforts are reviewed at least annually to determine adequacy when compared to existing trigger levels.

2.2.4 *Identification of representative non-technical work space*

AFRD inspects all office and administrative spaces 2-4 times each year. All deficiencies are noted and tracked in LCATs. All employees assigned to these spaces are evaluated for ergonomics issues. Whenever possible any findings are corrected on the spot.

AFRD has responsibility for several machine shops including those in buildings 71, 71B, 58, 52, and 16. In addition there are several electronics shops in buildings 58, 16, 71, and 52. These shops are managed and staffed primarily by Matrixed Engineering Division personnel and supervision. These spaces are controlled and inspected by AFRD as well as Engineering Space reviews

Space reviews were scheduled to include as many team members as possible in addition to the appropriate AFRD personal.

2.3 Interviews

Interviews were conducted as part of the space inspection plan. During the inspection process the team members ask questions of the employees assigned to the area. This information is used to focus the inspection and information gathering process.

3 Results

3.1.1 Noteworthy Practices

The ESH oversight provided by the above, with each group and experiment assigning an employee (see AFRD ESH Organizational chart-Appendix B) to be responsible to for compliance is one of the strong noteworthy practices.

The Superconducting Magnet Test stand in building 58 has redesigned and built experimental apparatus that exceeds required guarding and shielding particularly with respect to mechanical and electrical vulnerabilities. The installed shielding was designed to provide worker protection even as the experiment evolves in the future.

The L'Oasis experiment in building 71 has taken several steps beyond compliance. The interlock system exceeds requirements as well as a number of best practices with respect to electrical guarding and control practices. Examples of these best practices can be seen throughout this experimental area.

AFRD leads the lab in compliance in Posted Lockout/Tagout required procedures. All experimental apparatus that have more than one point of hazardous energy control have posted procedures.

AFRD leads the lab in posted interlock testing procedures. All AFRD experiments that require these posted interlock procedures are in compliance and logs of the periodic testing are kept.

AFRD does an excellent job of equipment, apparatus, and experiment specific training. An example is the super conducting magnet testing facility which gave safety training for all hazards component by component from one end of the experiment though to the other. This was accomplished during several safety meetings and all employees were involved as both presenters and trainees.

3.1.2 Observations

There was an issue at building 58. A matrixed employee from the engineering division went out for a long-term medical leave. He was the mechanical technical lead as well as the building manager. In his absence there were two recordable injuries and two ORPS reports issues in less than two months. Line management in both AFRD and Engineering missed the opportunity to identify the impact of the loss of this individual. The problem has been addressed by both divisions and should not continue to present problems.

3.1.3 Findings

AFRD has been very space challenged. The division occupies old buildings with numerous roof leaks, falling ceiling tiles, crumbling walls and floors and ground water leaks. All findings are being entered into LCATs and they are attempting to work with facilities to repair these problems.

Some of the spaces are cluttered with items that should be identified for disposal. This causes problems due to lack of space and creates clearance issues for equipment and machinery.

There still exist some problems with temporary electrical feeds for fixed equipment.

The division is aggressively attacking mitigating the above-mentioned problems and has shown a serious commitment to continue in this effort. The division has recently committed \$30,000.00 to clean out B58 and other areas.

3.2 Documentation

Documentation is provided in the appendices and consists of tables, links, and photographs.

3.3 Facility Authorizations

Pat Thomas (AFRD Safety Administrator) and the AFRD Safety Coordinator (currently Christine Celata) coordinate the renewal of AHDs annually. All new experiments are evaluated to determine the need for formal authorization. If a formal authorization is required the experiment may not proceed until such authorization is signed by the division (as stated in chapter 6 of pub 3000).

3.3.1 SADs, FSADS

AFRD has no SADs or FSADS

3.3.2 Other BAAQMD, EPA, EBMUD Permits

All AFRD experiments are evaluated for environmental and EPA permits. L'Oasis is one example.

3.3.3 *Status of the authorizations.*

All AFRD authorizations are evaluated annually for any changes in scope or hazards.

3.4 Formal Work Authorizations

AHDs

CBP (1):

2087 Anti-Hydrogen Trap

L'OASIS (1):

1043 Laser Optics Laboratory

Fusion (4):

1007 High Voltage Test Area

1008 2 MV/HCX Test Stand

1013 Hot Plate Source Test Stand

2088 Neutralized Drift Compression Experiment

IBT (8):

2022 Test Stand 3

2025 Test Stand 6A

2037 Test Stand 9

2043 Test Stand 8

2045 EBIT

2053 Bldg. 52 Neutron Generator

2061 Bldg. 6 Neutron Generator

2089 Seiko 8800 SE Dual Beam FIB

Supercon (4):

123 60 Strand Cabling Machine

134 Bldg. 58 Helium Plant

135 20 KA Power Supply

1048 Magnet Testing

Sealed Source Authorization and Radiological Work Authorizations

SSA:

131 Laser Optics Lab

RWAs:

1136 Bldg. 16 Neutron Generator

5124 Bldg. 6 Neutron Generator

5129 Laser Optics Lab

5521 Bldg. 52 Neutron Generator

5580 2MV/HCX

3.4.1 *Status of renewals*

Are all work authorizations current with respect to required review and renewal requirements? Describe Division's efforts in maintaining authorizations in a current status.

At this time all AHDs are current and have recently been reviewed to determine that the experiment is within AHD perimeters and personal. AFRD tracks and controls this process very well.

3.4.2 *Current personnel*

All authorizations are evaluated with respect to qualified and current personnel during program and area inspections. The required training profiles for each authorized worker are evaluated at this time. Any

deficiencies are noted and the appropriate supervisors are informed. The employee and supervisor/principle investigator are given direction as to the proper level of work activity acceptable until the required training is completed.

3.4.3 *Training*

96 % of AFRD employees and guests have taken the LBNL job hazards questionnaire.

92% of all required training has been completed.

The individual experiments are doing an excellent job of experiment and apparatus specific training. This includes all equipment and safety, through the use of written procedures and written controls.

3.4.4 *Authorization content reflects current conditions and requirements*

AFRD reviews this information annually or more frequently. 2-4 times each year all spaces are inspected and any changes to experiments are noted and reviewed. Principal investigators are required to notify the division of any changes that exceed the formal or informal divisional authorizations before they are allowed to proceed.

3.4.5 *Technical occupational safety and health issues review*

AFRD has some significant safety challenges in some of the buildings they occupy. Buildings 58 and 71 have pressing seismic deficiencies, resulting in large portions of these buildings remaining unoccupied. Additionally buildings 16 and 71 are both plagued with chronic roof leaks. This intuitional condition has resulted in the loss of experimental equipment and impeded the ability to do research.

Some spaces are cluttered with storage to the point of creating a safety issues. The division has attempted to address this by creating and funding line management authorized cleanup efforts. B58 alone was funded for \$30,000.00 to accomplish this task.

AFRD has a formal agreement with the Engineering division to cover the direction and safety issues of matrixed employees. With the one exception of recent events at building 58, this process works very well. Both divisions share responsibility for the safety of matrixed employees, share accident investigations, and assign root cause.

3.5 Validation of Hazard Identification Database (HEAR or equivalent)

Hear database information is reviewed during each space as it is inspected 2-4 times per year. Any new hazards or hazards that have changed are entered at this time. The same is true for other databases.

3.5.1 *Work Smart Standards Envelope*

All work in AFRD is within the work smart standards envelope. There are still a number of OSHA issues to resolve due to the age of the spaces, and the resources available. AFRD continues to make progress continue in this area.

3.6 Line Management ('Self-Authorization') Space/Operations

3.6.1 *Is Line Management authorized work properly identified*

AFRD does a good job of evaluating work to determine the hazard levels and vulnerabilities for the appropriateness of authorization. This is the primary reason that the division has both a safety administrator (Pat Thomas) and a safety coordinator (PhD. level career researcher).

3.6.2 *Validation of Hazard Identification Database (HEAR or equivalent)*

Hear database information is reviewed during each space as it is inspected 2-4 times per year. Any new hazards or hazards that have changed are entered at this time. The same is true for other databases.

3.6.3 *Technical occupational safety and health issues review*

AFRD does an excellent job of inspecting spaces including technical and non-technical spaces. This diligence is needed due to the age and condition of these spaces. For this reason AFRD inspects all spaces 2-4 times per year. This generates a very large number of findings. Findings are mitigated as expeditiously as resources and time allow. With few exceptions, the unresolved issues are intuitional and beyond the control of the division. These instances are tracked and any vulnerabilities controlled by AFRD. (Appendix C)

The division does excel in several areas including:

Student safety

Posted LOTO Procedures

LOTO Logs

Interlock testing Posted Procedures

Interlock testing Documentation

3.7 Non-Technical Space/Operations

All spaces in AFRD, including non-technical, are accessed 1-3 times each year.

Criteria include:

Ergonomics

Institutional Issues

Roofs/leaks

Radiation

Seismic/building movement

Floor, wall, and ceiling damage (tiles, cracks, leaks)

Noise

Storage

Access/egress

4 Recommendations

PY 04 Deficiencies	Planned Corrective Actions for PY 05	Status
E1. One experiment delayed for completion of safety review	E1. Develop coaching materials on ES&H resources and responsibilities for new PIs.	Not done. ES&H for Managers, Supervisors and PIs class is required in 2006.
E1. Some corrective actions delayed due to funding constraints.	E1. Work with Facilities and Program Heads to encourage funding of highest priority projects.	Bldg. 46 hoist and new l'OASIS clean room funded. Requested funding for additional projects.
E2. 2004 ISM Plan revision has not been completed.	E2. Finish plan revisions, review and approve, post on website, send out Director's safety memo	Completed. Working on 2005 revisions.
E2. Most Programs did not hold annual all-hands safety meeting with Director	E2. Track status; send monthly reminders to Program Heads.	Director held all-hands meetings with all Programs.

E7. Some AFRD employees with recommendations for ergonomic evaluations have had evaluations. Some recommendations from evaluations have not been implemented.	E7. Review JHQs with supervisors of employees/guests who may not need evaluations. Change "recommendation" to "requirement" for personnel working on computer > 4 hours/day. Conduct evaluations for all personnel with requirement for evaluation. Follow up with supervisors to ensure corrective actions are implemented.	Ergo evaluations completed. 88% of PY 05 evaluations resolved.
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E8. Chemical inventory has not been completed.	E8. Finish chemical inventory and check for peroxide formers.	Finished chemical inventory of all areas.
E12. 27% of supervisors of 2 or more AFRD personnel have not completed at least one safety walkthrough.	E12. Track status, send monthly reminders to supervisors, invite supervisors to participate in walkthroughs.	Tracked status. Sent some reminders, but not monthly. Invited some supervisors to participate in walkthroughs. 23% of supervisors have not completed walkthroughs.
E12. 20% of LCATS have not been completed.	E12. Prioritize and identify items that can be corrected first; discuss at Program all-hands meetings. Review assignment of Taskmasters.	LCATS completion still needs work. Discussed with Division Director, will be Performance Review criteria for assigned Taskmasters for 2006.

From AFRD division self-Assessment report

Action Plan for PY 2006**Improvement Action Plan**

PY 05 Improvements Needed	PY 06 Planned Actions
Improve SAA compliance	Frequent generator assistance walks and unannounced inspections of SAAs with problems.
23% of supervisors have not completed walkthroughs.	Track status, send monthly reminders to supervisors, invite supervisors to participate in walkthroughs.
25.8% of LCATS were overdue	Follow up with Taskmasters of overdue LCATS. Include as PRD criteria
4 uncontrolled peroxide-forming chemical containers found.	Held all-hands meeting with research group to reinforce procedures.

AFRD Planned Actions	Performance
E1.1 Division Director sends annual safety memo to all Division employees.	Memo sent to Level 1 AFRD distribution 4/5/05 by Safety coordinator on behalf of Division Director.
E1.2 AFRD ES&H Operations Committee meetings are held every month. Division management and each Program are represented at each meeting. The Division ES&H Plan, its implementation status, and ES&H issues are discussed at these meetings.	Meetings held every month, Average representation 74%. Various aspects of Division Plan implementation discussed at all meetings.
E1.3 AFRD ES&H Committee meetings are held at least 3 times/year. Division management and each Program are represented at each meeting. The	Meetings held on August 17 and March 1. Average representation 100%. Various aspects of Division Plan implementation were discussed at all

Division ES&H Plan and its implementation status are discussed at these meetings.	meetings.
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From AFRD division self-Assessment report

4.1 Findings

There were no significant violations of AHD or RWA conditions. Minor discrepancies were identified during annual reviews and walkthroughs and either corrected immediately or tracked through LCATS.

There were 54 OSHA instances assigned to AFRD. $41/54 = 76\%$ have been completed. 10 of the remaining 13 items are machine-guarding issues. A review of AFRD shops is in progress.

The division is not effectively implementing recommendations from ergonomic evaluations.

The division lacks resources to properly address all findings listed in LCATs.

5 Corrective Action Tracking and Follow-up

In particular, make note of efforts needed to track deficiencies found, e.g., measures to bring the HEAR database up to date, findings that should be entered into LCATS, etc.

Provide the appropriate language with emphasis on tracking the 'Findings' corrective actions in LCATS.

Hear database information is reviewed during each space as it is inspected 2-4 times per year. Any new hazards or hazards that have changed are entered at this time.

The division tracks all LCATs and reviews this information as each space is inspected. All new findings are entered at this time and open existing findings are reviewed.

(appendix C)

6 Noteworthy Practices

The ESH oversight provided the divisions ESH organizational structure with each group and experiment assigning an employee (see AFRD ESH Organizational chart-Appendix B) to be responsible to for compliance is one of the strong noteworthy practices.

The Superconducting Magnet Test stand in building 58 has redesigned and built experimental apparatus that exceeds required guarding and shielding particularly with respect to mechanical and electrical vulnerabilities. The installed shielding was designed to provide worker protection even as the experiment evolves in the future.

The L'Oasis experiment in building 71 has taken several steps beyond compliance. The interlock system exceeds requirements as well as a number of best practices with respect to electrical guarding and control practices. Examples of these best practices can be seen throughout this experimental area.

AFRD leads the lab in compliance in Posted Lockout/Tagout required procedures. All experimental apparatus that have more than one point of hazardous energy control have posted procedures.

AFRD leads the lab in posted interlock testing procedures. All AFRD experiments that require these posted interlock procedures are in compliance and logs of the periodic testing are kept.

AFRD does an excellent job of equipment, apparatus, and experiment specific training. An example is the super conducting magnet testing facility which gave safety training for all hazards component by component from one end of the experiment though to the other. This was accomplished during several safety meetings and all employees were involved as both presenters and trainees.

Notable ES&H performance accomplishments include:

- Updated hazards inventory and renewed work authorizations

- Performed 25 ergonomics evaluations.

- Maintained JHQ and required training completion rates > 90% all year.

- Closed 171 LCATS action items.

- Requested independent safety review of laser lab.

- Worked safely with no recordable accidents for AFRD employees or guests.

7 Conclusion

Overall AFRD has a strong organizational safety program that is generally effective in identifying and controlling hazards. The ESH program starts with the AFRD directorate and progresses down through the programs to the individual experiments.

The ESH committees are effective and responsive to divisional management and implement all policy and other direction through the experiments to the individual employees.

The division attempts to address any and all findings and in many cases currently exceeds minimum compliance well into best practices. This is particularly true for engineering controls such as guarding and shielding of machines and experimental apparatus.

Old and in some instances outdated buildings remain a problem particularly in the areas of seismic stability and water intrusion from leaking roofs, ceilings, and walls.

Some OSHA findings remain open and unresolved.

It is the conclusion of the IFA team that the division is operating safely and is within authorized limits.

Appendices

Appendix A: List of Facility and Formal Authorizations

Appendix B: List of Line Management Operations

Appendix C: Technical Occupational Safety and Health Inspection
Observations and Findings

Appendix D: Noteworthy Practices, Procedures and Conditions

Appendix E: Photographs

Appendix A: List of Facility and Formal Authorizations

AFRD AHDs

AHDs

CBP (1):

2087 Anti-Hydrogen Trap

L'OASIS (1):

1043 Laser Optics Laboratory

Fusion (4):

1007 High Voltage Test Area

1008 2 MV/HCX Test Stand

1014 Hot Plate Source Test Stand

2088 Neutralized Drift Compression Experiment

IBT (8):

2022 Test Stand 3

2025 Test Stand 6A

2038 Test Stand 9

2043 Test Stand 8

2045 EBIT

2053 Bldg. 52 Neutron Generator

2062 Bldg. 6 Neutron Generator
2089 Seiko 8800 SE Dual Beam FIB

Supercon (4):

124 60 Strand Cabling Machine
134 Bldg. 58 Helium Plant
135 20 KA Power Supply
1048 Magnet Testing

Sealed Source Authorization and Radiological Work Authorizations

SSA:

132 Laser Optics Lab

RWAs:

1136 Bldg. 16 Neutron Generator
5124 Bldg. 6 Neutron Generator
5129 Laser Optics Lab
5521 Bldg. 52 Neutron Generator
5580 2MV/HCX

Program	Due Date	AHD #	Title	Location	PI(supervisor)	Current Status
Supercon	10/1/2005	1048	Superconducting Magnet Testing	58-101	Al Lietzke	inactive - update - next test Oct

Supercon	10/1/2005	134	Helium Plant	58-101,105	Al Lietzke	inactive - update - next test Oct active - modified 8/19/04 for
IBT	10/29/2005	2053	Neutron Generator	52	Jani Reijonen	rabbit
IBT	10/29/2005	2025	Test Stand 6A	5-100	Sami Hahto	active
FUSION	11/30/2005	2088	Neutralized Drift Compression eXp1	58A-102	Simon Yu	active
IBT	12/17/2005	2089	Seiko 8800 SE dual beam FIB	16-101	Thomas Schenkel	active
IBT	1/14/2006	2037	Test Stand 9	5-150	Qing Ji	active
FUSION	1/26/2006	1008	2 MV/HCX	58A-004	Peter Seidl	active
IBT	2/28/2006	2043	Test Stand 8	5-102	Sami Hahto	active
LO	2/28/2006	1043	Laser Optics Lab	71-253A-D, 146		active; adding magnetic spectrometer
Supercon	3/14/2006	123	60 Strand Cabling Machine	B&L	Wim Leemans (Toth)	
IBT	3/28/2006	2061	Bldg. 6 Neutron Generator	52-100	Dan Dietderich (Higley)	active
FUSION	3/31/2006	1013	Hot Plate Source Test Stand	6	Ludewigt (Reijonen)	active
IBT	4/5/2006	2022	Test Stand 3	58A-102	Peter Seidl(Baca)	personnel change
IBT	5/19/2006	2045	EBIT	16-101	Jani Reijonen	active; being modified
Supercon	6/2/2006	135	20KA Power Supply	16-108	Thomas Schenkel	active
FUSION	6/30/2006	1007	High Voltage Test Area	58A-002A	Al Lietzke	active
CBP	9/14/2006	2087	Anti-Hydrogen Trap	58A-002C	Will Waldron	active
IBT	hold	1062	SNS klystron - 1 MW RF testing	58A-002B	Joel Fajans	active
CBP		1059	BTF Laser Experimental Station			inactive; may re-activate for future use
CBP/Fusion		1064	RTA	71-103	Alessandro Ratti	
DARHT		2018	DARHT HV Column Assembly	6	Wim Leemans	inactive; expired
DARHT		1056	DARHT High Voltage Core Module	58A-104	Steve Lidia	inactive; to be dismantled?
FUSION		1034	Final Focus	60-101	Bill Elliott	inactive; expired
FUSION		1054	MBE-4/NTX	58A-002B	Will Waldron	inactive; expired
Fusion			400 KV IB Test	58A-102	Peter Seidl	inactive - expired see 400KV IB Test; being modified for NTX
IBT		2013	SNS Front End Test Stand	58A-102	Peter Seidl (Stoker)	Line Management Authorization
IBT		1019	Laser Lab		Kwan	inactive - equipt. moved to Oak Ridge
IBT		1030	Test Stand 11	71-115	Alessandro Ratti	inactive - Don Lucas took laser to Bldg. 70
IBT		1052	MEVVA Ion Implant	5-112	Ka-Ngo Leung	inactive, LMA
Supercon		2011	3 Meter Magnet Press	16-109,125	Ka-Ngo Leung	Line Management Authorization
				53-004	Andre Anders	
				51-008	Al McInturff	inactive

AFRD Radiological work authorizations

Program	Renewal Due	Auth #	Type	Title	Location	PI(supervisor)	Status	EH&S Contact
IBT	11/30/2005	5521	RWA	Neutron Generator	52-0111	Jani Reijonen	active	Ted de Castro
LO	4/27/2006	131	SSA	Laser Optics Lab	71-146B	Wim Leemans	active	David Kestell
LO	6/30/2006	5129	RWA	Laser Optics Lab	146 B&L	Leemans (Toth)	active	Rick Donahue
IBT	6/30/2006	1136	RWA	TS 3 Neutron generator	16-0101	Jani Reijonen	active	Ted de Castro
FUSION	9/30/2006	5580	RWA	2 MV/HCX	58A-004	Peter Seidl	active	Ted de Castro
IBT	9/30/2006	5124	RWA	Bldg. 6 Neutron Generator	6	Ludewigt (Reijonen)	active	Rick Donahue

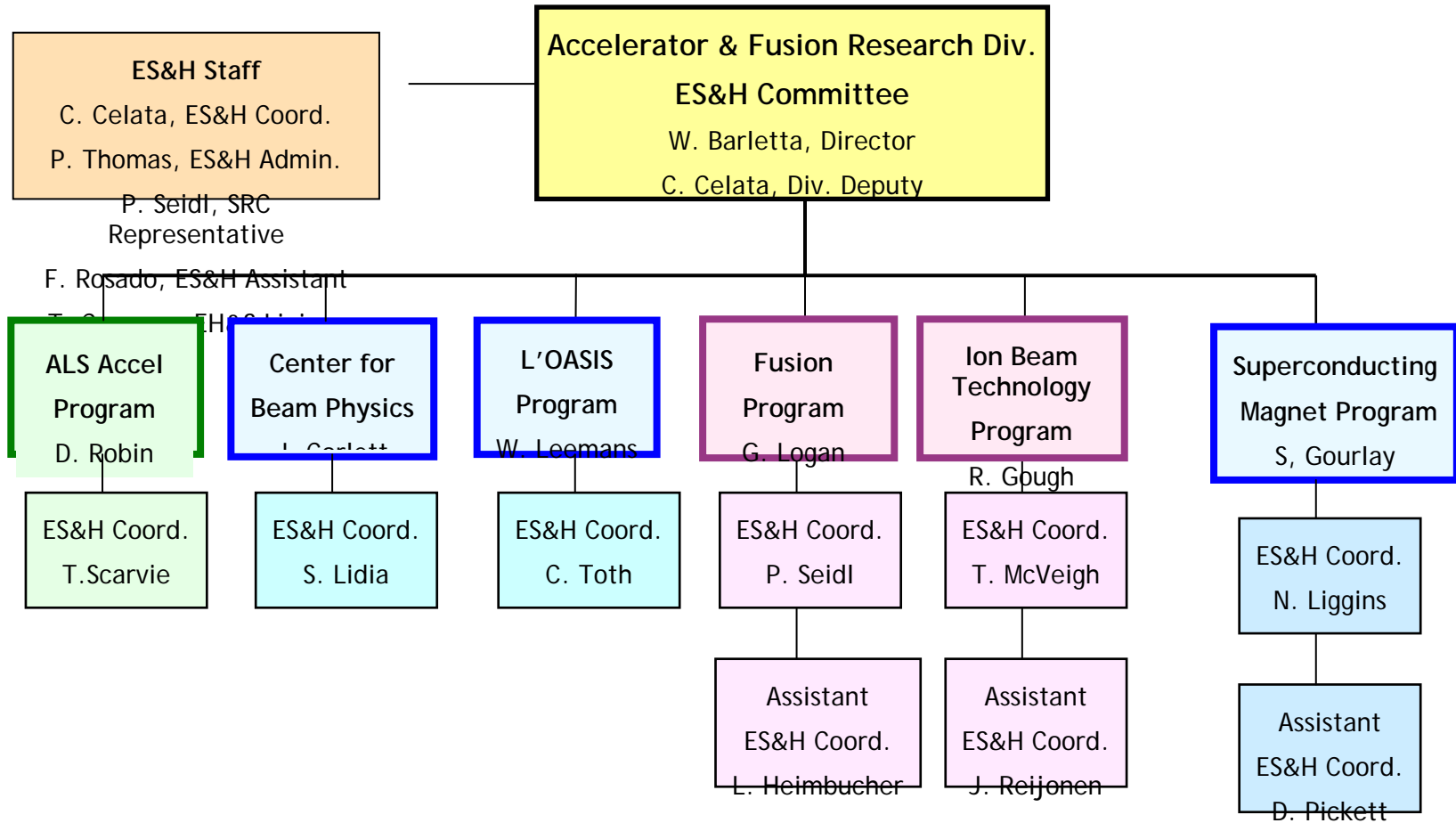
AFRD Space Plan



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Appendix B: List of Line Management Operations

AFRD ES&H Committee



Updated 07/05

Appendix C: Technical Occupational Safety and Health Inspection Observations and Findings



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Month	Incidents
July 04	
August 04	Broken ankle, matrixed student, fell on way home - non-recordable
September 04	Repetitive motion, AFRD guest, Bldg. 47 - first aid
October 04	Repetitive motion, AFRD guest, Bldg. 71 - first aid
November 04	PCB spill, Bldg. 71 (non-AFRD) Hand laceration, AFRD employee, Bldg. 6 Fire, Bldg. 16, non-ORPS Toe injury, AFRD employee, airport
December 04	
January 05	Repetitive motion, matrixed employee, Bldg. 47 - recordable
February 05	
March 05	Foot injury, matrixed employee, Bldg. 58 - DART & ORPS
April 05	Back injury, matrixed employee, Bldg. 77 - DART
May 05	Arm injury, AFRD employee fell on wet stairs, ORNL
June 05	Electrical ORPS, matrixed employees Bldg. 58

Appendix D: Noteworthy Practices, Procedures and Conditions

The Superconducting Magnet Test stand in building 58 has redesigned and built experimental apparatus that exceeds required guarding and shielding particularly with respect to mechanical and electrical vulnerabilities. The installed shielding was designed to provide worker protection even as the experiment evolves in the future.

The L'Oasis experiment in building 71 has taken several steps beyond compliance. The interlock system exceeds requirements as well as a number of best practices with respect to electrical guarding and control practices. Examples of these best practices can be seen throughout this experimental area.

AFRD leads the lab in compliance in Posted Lockout/Tagout required procedures. All experimental apparatus that have more than one point of hazardous energy control have posted procedures.

AFRD leads the lab in posted interlock testing procedures. All AFRD experiments that require these posted interlock procedures are in compliance and logs of the periodic testing are kept.

AFRD does an excellent job of equipment, apparatus, and experiment specific training. An example is the super conducting magnet testing facility which gave safety training for all hazards component by component from one end of the experiment though to the other. This was accomplished during several safety meetings and all employees were involved as both presenters and trainees.

Appendix E: Photographs